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Forestry in the Agricultural Colleges and Experiment Stations.

A BULLETIN on the subject of Forestry has lately been issued by the Agricultural Experiment Station at Brookings, South Dakota. When we consider how young this station is, and how much time is necessary to determine and prove the substantial facts in relation to forestry; and when we consider further that a climate in which the rainfall from the first of September, 1888, to the thirty-first of August, 1889, was less than ten inches is rather a discouraging one for the tree-planter, we need hardly expect to find in this record much that is of general interest and application. And yet every reader will be pleased to note that so far as they go, these experiments indicate that fruit-growing and forest-planting can be made successful on some of the Dakota prairies.

The bulletin goes into particulars as to planting and cultivation, and gives in detail just such information as the tree-planters of that region stand in need of. The problems discussed, however, are not all of merely local interest, for no one can read without profit the testimony in favor of shallow cultivation as a means of mitigating the effect of drought, for it illustrates a principle of universal application. Even in sections where the annual rainfall is much greater than it is at Brookings, it is important in our hot, dry summers to husband the supply of soil water. The records of the Dakota Station show that but a fraction more than three inches of rain fell during the three spring months of this year, and that a hot June followed with a rainfall of less than one and a half inches. It is not surprising that the prairie grass seemed dead for want of water, but it is instructive to read that, even then, moist soil could be found anywhere in the plantation of young forest-trees by brushing away a little of the surface with the foot. This condition was due to frequent shallow stirring with harrow-tooth cultivators, and it is another evidence that a thin layer of loose earth—a "dust blanket"—is a most efficient mulch in any climate, and that if "there is a remedy short of irrigation for long seasons of drought, it will be found in deep plowing and thorough shallow cultivation."

The purpose of this article, however, is not so much to discuss the matter of this particular bulletin as to call attention to the fact that the country has a right to expect from the agricultural colleges and stations a good deal of substantial work in forestry, even if it is elementary. At the late meeting of the American Forestry Association in Philadelphia, Mr. N. H. Egleston, of Washington, offered a resolution "that our agricultural colleges should regard it as one of their most manifest duties to give the subject of forestry a prominent place in their curricula of instruction, and that every experiment station should engage in investigating those branches of forestry which have special importance in the localities in which they are situated, or which are of general interest to agriculture and the arts." This resolution was adopted without reference to a committee, and the facts of the case seem to give ample justification for it.

The forests of the country have, beyond question, important relations to agriculture and the mechanic arts, and it was for the promotion of these that the colleges were founded by the general government. The experiment stations were endowed for the purpose of research in the sciences connected with agriculture, and this purpose would naturally include investigations in the field of forestry. The colleges have an endowment of about $15,000,000, with some 700 professors and 12,000 students. There are forty-six experiment stations, with eleven branch stations, employing 370 observers, a large portion of them trained in the prosecution of experimental inquiry, and in addition to $125,000 a year given by individual states, besides fees for analyses and the like, these stations receive from the general government $600,000 a year. Institutions manned and equipped with such care and at such cost ought to be able to give some attention to so important a subject as that of forestry. Some of the colleges and stations have begun forestry work in earnest, as this Dakota bulletin testifies, and perhaps preparation for the work is going on in all of them. In the great majority of them, however, neither catalogues, reports nor bulletins make mention of the subject.

In a country where there is no systematic forest practice, and therefore no trained foresters, we cannot expect the colleges to give instruction in the refinements of the art, nor would it be profitable for the stations to make such investigations as are carried on in the older forest experiment stations of Europe. But much work of immediate practical utility can be prosecuted in the nursery, the field, the laboratory and in the natural forest, where there is one within reach and under the control of the station or college. This is not the place to state the problems which can be hopefully attacked in this way, but an admirable outline of the general field of research is given in Mr. Fernow's report for 1887, which was reviewed in these columns at the time it appeared. What is first wanted is a realization by the colleges and stations of the necessity for work in forestry and a determination to undertake it. The particular course to be pursued by each will be matter for after consideration.

Peter Kalm, a Swedish naturalist and a pupil of Linnæus, visited America in 1748, at the instigation of the Swedish government, for the purpose of examining the natural resources of this country. His journal, afterward translated into English, gives one of the best accounts of the natural features of the northern states, in which Kalm traveled extensively, and of the agricultural resources of the people that appeared during the last century. The following quotation from this journal is as true to-day as when it was written 130 years ago. The same wasteful methods of treating forest-property are still in force over a large part of the territory of the United States. They have wrought inestimable damage to great areas of country, and must sooner or later destroy the productiveness of this land. That this habit of annual burning has not done already greater damage than it has, shows the wonderful fruitfulness of this country and the recuperative powers of the

forest in the moist and salubrious climate of eastern North America. It can be a question of time only, however, when the annual burning which Kalm lamented in the following passage, will exterminate the forests and destroy the reproductive strength of the soil:

"The leaves which dropt last autumn had covered the ground, in depth three or four inches. As this seems to hinder the growth of the grass, it was customary to burn it in March, or at the end of that month (according to the old stile), in order to give the grass the liberty of growing up. I found several spots burnt in this manner to-day; but if it be useful one way, it does a great deal of damage in another; all the young shoots of several trees were burnt with the dead leaves, which diminishes the woods considerably; and, in such places where the dead leaves had been burnt for several years together, the old trees were only left, which being cut down, there remains nothing but a great field, without any wood. At the same time, all sorts of trees and plants are consumed by the fire, or at least deprived of their power of budding; a great number of plants and most of the grasses here are annual; their seeds fall between the leaves, and by that means are burnt: this is another cause of universal complaint, that grass is much scarcer at present in the woods than it was formerly; a great number of dry and hollow trees are burnt at the same time, though they could serve as fewel in the houses, and by that means spare part of the forests. The upper mould, likewise, burns away in part by that means, not to mention several other inconveniencies with which this burning of the dead leaves is attended. To this purpose the government of Pensylvania have lately published an edict which prohibits this burning; nevertheless every one did as he pleased, and this prohibition met with a general censure."

It would be interesting to know whether the people of Pennsylvania have acquired sufficient intelligence and self-restraint during the last century and a half to submit willingly to the enforcement of the act which met with such general censure at the hands of their ancestors.

Professor Shelton, of the Kansas Agricultural College, explains in a recent number of *The Industrialist*—a bright little paper edited and published by the faculty of that institution—a new irrigation project for the western or "arid," section of that state, which will be watched with interest. It seems to have been known for a long time that at almost any point in the wide valley of the Arkansas River, water can by drilling be reached at a very shallow depth, usually from four to nine feet. This water is found in a stratum of sand so thoroughly saturated that enormous quantities can be pumped up without diminishing the supply in any appreciable degree. This subsoil water is supposed to have a distinct movement, flowing along as the river flows, and it is argued that the river itself is but the visible and superficial outflowing of the great underground stream. Professor Shelton adds:

With these facts in view, Judge Gregory, editor of the Garden City *Sentinel*, has advanced the idea that, by tapping this underflow with a ditch of suitable size and depth, a permanent supply of water for irrigation may be led to elevated regions, just as water from the river is ordinarily led away for use on the uplands. This original plan has been brought to the attention of the public with great persistence and force by means of circular addresses and newspaper articles. As a result of this agitation, conducted by Mr. Gregory, the attention of practical irrigators has been drawn to the subject, and measures have been taken to give the new scheme a practical test upon a large scale. The corporation owning the great Dodge City ditch—a canal twenty-five feet wide and nearly 100 miles long—is already at work upon an extension of their main ditch which will intercept a full mile and a quarter of this sub-flow. This, with the number of powerful steam pumps planned for use another season, will certainly prove to what extent the underflow of the water of the Arkansas River is available to the husbandman.

No doubt these enterprising men realize that a permanent water supply is quite as necessary to sustain the even flow of an underground current as it is in the case of an ordinary stream. While they are tapping this hidden river, therefore, the projectors of this scheme should use every effort to save the forests where it takes its rise.

Holiday Notes in Southern France and Northern Italy.—VII.

MY note-book was next brought into requisition in the picturesquely situated and beautiful city of Genoa, where there is abundance of interesting things to note for the benefit of the stay-at-home gardener.

Immediately after leaving the large, handsome station we come upon the Columbus monument, surrounded by Date Palms and other members of more or less tropical floras, which we were destined to see in great number, vigor and beauty for some distance along this beautiful coast. The Cape of Good Hope, Mexico and Australia are centres of plant life, which seem to find their counterpart in the hot, almost rainless, summers and the very mild winters of Genoa and its neighborhood. At any rate, large numbers of shrubs and trees from these countries thrive in the Riviera so well that it is difficult to imagine their succeeding any better even in their native habitats. Acacias, Myoporums and Pittosporums of large size, fine Dasylirions and enormous Agaves combine to produce a strangely exotic effect. Here, as well as elsewhere, we were somewhat disappointed to find little or no use made of such beautiful native shrubs as the Myrtle, Terebinth and the like.

Acqua Sola, a small park at the north-east end of the city, and about 140 feet above the level of the sea, is a favorite promenade. It occupies the site of part of the old ramparts, and was laid out in its present form about half a century ago. Then we pass on to the Villetta di Negro, a well kept garden with winding promenades, which ascend to a bastion about 150 feet above the level of Acqua Sola. Fine views of the harbor, city and neighborhood are obtained from this spot. The old walls have allowed plenty of space for climbers, and such things as the yellow *Bignonia Tweediana*, *Solanum jasminoides* and other plants of similar character have thriven exceedingly. The common Ivy (*Hedera Helix*) clothed some of the steep, sunny banks, and here and there *Convolvulus Mauritanicus*, with its slender shoots bearing a profusion of pale blue flowers, grew out of the Ivy carpet, seemingly quite satisfied with its quarters. *Fluggea Japonica* was here also used for forming a turf in dense shade, just as we had seen it in the gardens on the north Italian lakes, and so far we have seen nothing which produced such satisfactory results. Very tall Date Palms, with thick stems, were, in the opinion of my companion and myself, spoiled by training Ivy and other creepers round them. A sort of ravine, with a small watercourse, provided suitable places for Colocasias, and other moisture-loving, fine foliage plants. *Melia Azedarach* (laden at the time of our visit with panicles of small round fruits about the size of peas) is a Genoa shade tree, as is also the Carob (*Cerotonia Siliqua*), with its handsome, leathery, black-green, pinnate leaves.

Cycads were only represented by *Cycas revoluta*, and Palms by scarcely half a dozen species. The common Date Palm (*Phœnix dactylifera*) and a dwarf species (*P. reclinata*), the South European *Chamærops humilis*, the Japanese and Chinese *Trachycarpus excelsus*—or, as nurserymen mostly prefer to call it, *Chamærops excelsa*—and the Californian Fan Palm, *Washingtonia filifera* (better known as *Pritchardia filifera*), conclude the list as far as the public gardens of Genoa are concerned. The last-mentioned Palm is a remarkably quick grower, and magnificent examples of it are to be seen along the Riviera—some before long will become the rivals of the celebrated pair in the Californian city of Los Angeles. The Director of the Public Parks and Gardens at Rio de Janeiro told me a week or two ago that a specimen in one of the Rio gardens has attained huge dimensions and produces fruit in abundance. In a small pond, too much shaded by trees for the perfect happiness of sun-loving aquatic plants, we noticed *Nelumbium speciosum* in flower.

Leaving Genoa, the railway skirts the Mediterranean coast line, and affords the traveler a succession of enchantingly beautiful views. The train carries him past bare, frowning, lofty rocks, with their bases washed by the sea and their summits crowned with ruined towers erected in former ages for protection against pirates; then extensive, terraced Olive groves—gnarled and picturesque—Citrons, Oranges, etc. Here and there between the railway and the sea are small patches of flat ground, and these are generally utilized for growing fruit and vegetables. Constant irrigation is, however, necessary, and we became quite familiar with the sight of water being raised from a well by a donkey working in a circle under a thick, vine-clad roof, and then conducted along small channels to the slightly sunken beds. Not a weed was visible in these gardens, and very fine crops of Tomatoes, Aubergines, Lettuces and other vegetables were the rule.

Bordighiera, a few miles from the French frontier, is specially famous for its Palm groves, and presents an exceedingly picturesque aspect. According to Dean Alford, there are more Palms here than in the whole of the Holy Land. A considerable trade in Palm leaves is done in Bordighiera; in fact, that town may be said to possess the monopoly of supplying blanched Palm leaves for church purposes. The young growths are tied up tightly in order to make them the requisite color, and plants so treated are anything but ornamental in appearance. Fortunately, however, a comparatively small proportion of the Bordighiera Palms are undergoing such treatment at one time. The Date Palm is said to have been introduced to this coast more than a thousand years ago, and in the garden (of the French Consul at Bordighiera) which now occupies the site of a Dominican monastery, there are huge trees which are believed by their present possessors to have been planted by the Dominicans upward of ten centuries ago. All along this district, too, the Olive is seen in its full beauty—and a fine Olive tree is a really beautiful sight. It is not pollarded, as in southern France toward Marseilles, and in Languedoc, but allowed to attain tree size and grow in a perfectly natural way. *George Nicholson.*

Pinus Banksiana on the Maine Coast.

IT has been known for some years to a few botanists and others that the northern Gray or Scrub Pine (*Pinus Banksiana*) grew abundantly on the coast of Maine much farther south than had ever been supposed, but until recently no statement of the fact has ever been published. Those who are curious to know how the discovery occurred will now find in the November number of the *Bulletin of the Torrey Botanical Club* (vol. xvi., No. 11) some notes relating to the fact written by Mr. John H. Redfield and myself.

The station is on Schoodic Peninsula, in the town of Gouldsboro, Maine, lying opposite the eastern shores of Mount Desert Island across the expanse of Frenchman's Bay, and is well marked by the bare, flat-topped mass of Schoodic Mountain, 417 feet in height. Apart from this elevation the surface of the peninsula is for the most part level, and often boggy, overgrown by an uninteresting growth of low deciduous trees and the common conifers of the coast, with here and there, especially on the mountain slopes, great Alder patches. Throughout this region, from within sound of the sea to the interior of the peninsula, and stretching at intervals miles beyond its limits to the northward, grows *Pinus Banksiana* in its most southern home now on record, the latitude being about forty-four degrees twenty minutes. In the lowlands this Pine here attains a height of twenty to thirty feet, forming a slender, graceful tree, well distinguished from the Spruces, in spite of its short leaves, by its less conical form, by the bunching of its leaves toward the extremity of the twigs in the manner of Pines generally, and by its peculiar cones curved at the tip. On the east it forms almost a forest, nearly displacing the usual conifers of the Maine coast. Toward the west, however, the growth becomes thin—although this may be due to a free use of the axe—and decreases until only scattered trees appear here and there. On the mountain-top it again appears, but in a much changed form. There it is a true Scrub Pine, dwarfed, weather-beaten, twisted into many a strange shape, along the bare, exposed and wind-swept summit. On the peninsula it certainly is the prevailing Pine, almost to the exclusion of the other species. Beyond here its extent northward and inland is not well known. As Mr. Redfield remarks, it would be interesting to know what degree of continuity there may be between this station and the larger areas in northern Maine.

The presence of this interesting Pine on the Maine coast appears to have a certain appropriateness. Despised as it may be elsewhere in comparison with the beauty and value of the other Pines, here its whole character is in keeping with the rugged, storm-swept surroundings. As a tree for cliff or shore planting on this rocky coast I am convinced it would have great worth, for it appears able to adapt itself to the most exposed situations. To me, I confess, it has as a tree a peculiar beauty of its own, and even as a dwarfed shrub it appears to greater advantage than the other conifers of the coast.

Boston. *Edward L. Rand.*

In a lawn of small dimensions the losing of the turf under the shrubs is of the utmost importance, as it gives an appearance of extent to its limited proportion. To help this, Periwinkle, St. John's-Wort and other ground creepers may be planted with the shrubs, and by uniting them with the lawn will tend to diminish the hard line of the border, a thing that cannot be too strongly insisted on, as essential to continuity and repose.—*W. S. Gilpin's "Practical Hints,"* 1832.

The Kauri Pine.

OUR illustration upon page 583 represents a fine specimen of the Kauri Pine of New Zealand, one of the giants of the vegetable kingdom, and, economically, a tree of very great value.

It belongs to the small genus Agathis (Dammara of many authors, who have adopted for these trees the name applied by Rhumphius indiscriminately to several resin-bearing trees of different families), closely related to Araucaria and Cunninghamia, and characterized by dicœcious flowers; the male in short, cylindrical, extra-axillary heads, with numerous stamens with short, eight to fifteen celled anthers; the females terminal, maturing at the end of the second year into short, cylindrical cones, with thick, coriaceous, densely imbricated scales; and by sub-opposite, ovate-oblong or lanceolate thick, leathery leaves, one to three inches long, and an inch or more wide.

Eight or ten species of Agathis have been described, but it is not impossible that the number can be considerably reduced when they are better known; they are found in the Malay Archipelago, in the Fiji Islands, New Caledonia, New Zealand and east tropical Australia. The best known of the species is the Kauri Pine (*A. australis*), a native of New Zealand, where, in the Auckland district of the northern island, in sheltered mountain valleys, it often forms extensive forests, reaching a height of 150 feet, with a trunk sometimes fifteen feet in diameter. The wood of this tree is probably not surpassed in value by that of any other coniferous tree. It is pale straw-colored, moderately hard, straight-grained, sound and remarkably durable. It works easily with a beautiful silky lustre and takes a fine polish. It is an admirable cabinet-wood, and is largely used in New Zealand for railroad-ties and piling; for all sorts of building purposes and for cooperage, and is now somewhat exported into Great Britain.

The Kauri Pine produces also one of the most valuable gum-resins known, now largely used in making varnish. This resin is exported annually from New Zealand to the value of nearly two million dollars. It is not obtained, however, in great quantity from the living trees, but is dug out of the ground from the sites of old forests, where none of these trees have been known to exist since the earliest discovery of the island. This semi-fossil resin, however, which is far softer than amber, does not greatly differ from that which exudes from the living trees, which are productive only when they have passed their prime and are becoming decrepit.

It is not improbable that the Kauri Pine, and possibly some of the other species of Agathis, may thrive in different parts of California, although it is doubtful, perhaps, if any of the conifers of the southern hemisphere will ever attain anywhere north of the equator the age and size which they reach in their native countries, or produce as valuable material. They are, nevertheless, well worth trying in southern California, and it may well be one of the aims of the managers of the new Arboretum which is soon to be planted in connection with Mr. Stanford's University, to collect there all the most valuable timber trees of the south temperate zone. They can be grown in no other part of the United States, and among them, as we know already in the case of various species of Eucalyptus, are many trees apparently fairly well suited to the climate of California and of Mexico.

The Art of Gardening. An Historical Sketch.

XIV.—Suburban Rome.

CHATEAUBRIAND aptly compares the present aspect of the Roman Campagna to the desolation of Tyre and Babylon, "a silence and a solitude as vast as the noise and tumult of the men who formerly occupied the same soil." Scarcely a tree is visible, and the only product seems to be the "ruins which appear like a forest of indigenous plants, the growth of a soil composed of the skeletons of the dead." As it looked to-day, so—except for its crop of ruins—the Campagna looked in the early days of Rome, and its climate was as malarious then as now. But, in the imperial time, drainage and cultivation, an enormous supply of water brought from distant hills, and the making of multitudinous well-built roads, had redeemed it from barrenness and disease and had turned it into one vast garden. For miles around Rome lay the villas of its wealthy citizens, the richest patrician families owning not one but several, "planned and arranged on a different principle in accordance with their destination as winter, spring or

summer residences.* Some stood in extensive domains—the ruins of the various buildings belonging to one cover nearly a square mile of ground; others were of smaller size, but all were planned with a regard for comfort and surrounded with a care for systematic beauty that are nowhere paralleled on a similar scale to-day. The most common practice was to use the suburban villa in spring, spending the midwinter in Rome, and escaping to sea-side or mountains during the greatest heat of summer. The Roman citizen did not abandon the service of the commonwealth or the management of his private affairs until the decadent days of the empire; thus, when the short winter was over, he could not immediately desert the city, but spent vast sums instead on a suburban residence. Six or seven miles from the metropolis meant nothing to him, mounted on a Numidian pony or whirled along in a hooded carriage to the gates, where he was obliged, by the crowded state of the narrow streets, to transfer himself to a litter. "The number of these villas is really incredible. . . . In the golden age of the empire, before the transformation of Rome into an intrenched camp, accomplished by Aurelian, it was impossible to define, even approximately, its extent. . . . To the houses adjoining one another succeeded a second ring of houses separated by small gardens, a third ring of houses separated by larger estates, and lastly, a fourth ring of great villas and huge *latifundia*, each one constituting a populous and flourishing village. These groups of rustic dwellings were laid out in the town fashion, with the shrines of the compital or domestic gods at the street corners, and with local festivities and solemnities. . . . Great care was bestowed on the drainage of the house, which was always carried to a great distance and forced through its channel by a permanent jet of water. Remarkable, also, were the arrangements for the supply of water, which, when not actually needed, . . . was stored in huge reservoirs or cisterns, ready for any extraordinary emergency. At the crossing of the roads . . . there were fountains for the accommodation of travelers and their horses," and seats were set under the trees for the comfort of weary pedestrians. The great arcaded aqueducts, the temples, shrines and altars, with their marble sides and roofs of bronze, the "endless marble cemeteries, shaded by the Ilexes of the villa and by the Olive-trees of the farm," followed one another in orderly succession. The villa† itself was, as a rule, "divided into two distinct and independent portions. The first comprised the lord's manor, with more or less spacious gardens surrounding it; the second comprised the farmer's house, the various stables and barns, the dwellings of the slaves, orchards, Olive-yards, vineyards, corn-fields, woodlands and so forth." On the hill-sides the villa rose "in steps and terraces from the foot of the hill, each terrace supported by huge foundation walls ornamented with niches and *nymphæa*. The lower terraces never contained buildings; they were simply laid out in gardens, and less frequently in an orchard; the mansion of the landlord was perched on the very top of the hill and within the area of the highest terrace." The type was an excellent one, affording the best possible outlook and permitting that lavish use of ornamental water which the Romans loved above all else. "But it is incredible how ingenious and clever ancient architects proved themselves to be in adapting the general type of villa to the natural conditions of the special tract of land which had been selected," and in placing the house so that it would best serve the owner's desire to use it as a winter or a summer residence. "The characteristic of an ornamental Roman garden was the entire absence of natural beauty. Its style can be compared, to a certain extent, to the French and Italian villas of the sixteenth century." Topiary work was practiced (as we saw when Pliny's far-off country-seat in Tuscany was described) to an extent so great that Lanciani ventures to say "no tree or shrub dared to grow in its own natural fashion." . . . The *allées* were shut in by walls of green Box or Laurel with windows, doors and niches imitating the architecture of palaces. Here and there appeared threatening forms of wild beasts, bears and lions, serpents winding themselves around trees, "all cut by the skillful hand of the *topiarius* out of the green Cypress, Box, Yew-tree, Myrtle and Laurel. . . . Grounds laid out in this style, in which . . . every vestige of Nature's free dominion is annihilated, are not only described by ancient writers . . . but actually painted, I might almost say photographed, in the frescoes of Pompeian dining-rooms, in those of the green-house in the gardens of Mæcenas on the Esquiline, and in those found in the villa of Livia. . . . An excuse for such absurdities can be found in the fact that the means afforded by Nature in those days were but small in comparison with the abundant resources of our time. Foreign countries had not as yet unfolded their rich treasures of rare and splendid vegetation, nor their thousand shrubs and flowers; restricted to a barren flora, but little improved by culture, the Romans sought to create by artificial means a striking contrast to the free forms of nature. This is, at all events, the excuse given by Becker."* But it hardly seems a sufficient excuse. The comparatively few plants native to central Italy would have sufficed for combination into lovely "naturalistic" effects, had the taste of the time run in that direction. It is not the born lover of natural landscape beauty who asks, first of all, for endless variety in the items which the prospect supplies—it is, rather, the sophisticated horticulturist, or the scientific student, or the man in whom curiosity is stronger than the æsthetic feeling, or a delight in single objects is stronger than admiration for a general effect. The Romans loved formal gardens because their taste in all things was architectonic. In art, as in all other forms of activity, they proved themselves great organizers, practical constructors, lovers of system, regularity and usefulness, not men of poetic imagination or of purely æsthetic impulse. They were far more remarkable as architects than as poets, sculptors or painters, and their gardens were naturally those which an architect, rather than a poet or landscape-painter, would admire. But I have said that there were exceptions to the general rule of formality in the suburban gardens of provincial towns and in the imperial pleasure-grounds of Rome; and Becker believes that such was likewise the case among the villa-gardens of the Campagna. The hero of his "Gallus" owns a *villa urbana*, where, in addition to the symmetrical clipped garden, there is another of natural loveliness.

We are not surprised to find that these luxurious yet practical Romans were the inventors of the green-house. It is not mentioned before the first century of our era, but was then extremely common, and, as in modern times, was roofed with glass and heated by pipes. Here such exotic plants as could be obtained were carefully tended, and fruits, vegetables and flowers were assisted to early development or even forced to perfection during the winter months. Great aviaries and *viridaria* or preserves for animals were likewise common—indispensable, indeed, in places of any pretensions; and the former were often large enough to contain trees of considerable size. Huge fish-ponds, as useful as they were ornamental, were walled around with marble and kept pure by constant streams of water from the exhaustless aqueducts.

Although the poorer classes of Roman citizens were buried pell-mell in great heaps on the hill-sides near the city, much pains and money were lavished on the tombs of wealthier citizens, whether their bodies were interred or cremated. In either case the relics were enshrined in sumptuous buildings, placed along the suburban highways, greatly to the increase of their magnificence of effect. No traveler need be reminded of the remains of such monuments which are still visible on the Appian Way. The so-called Castle of St. Angelo, at Rome, is the central building of the mausoleum of Hadrian, once surrounded by a wide garden, and covered, up its terraced sides, with rich plantations; and across the river stood a similar construction which was the resting-place of Augustus.

In the Roman cemetery still preserved at Arles were long lines of small monuments overshadowed by the inevitable Cypress-tree.†

New York. *M. L. Van Rensselaer.*

* Lanciani: "Ancient Rome in the Light of Modern Discoveries." From this recently published and very valuable work most of the facts in this chapter have been gathered.

† *Villa urbana, villa pseudo-urbana* or *prætorium* was the suburban residence of a more elegant, *villa rustica* of a more simply utilitarian sort. It is the former, of course, which concerns us here, and it got its name because the disposition of the town house was closely followed, though often on a more splendid scale and always with a greater regard for external effect.

* See Becker's "Gallus." This book and the same author's "Charikles" are romances, but were written by a learned German student of antiquity for the purpose of portraying, as accurately as possible, the life of a young aristocrat, in the one case in imperial Rome, in the other case in Athens. Their explanatory notes are much more voluminous than the text itself, and even Lanciani quotes from Becker with a lavish hand. Both works have been translated into English.

† McGibbon: "Architecture of Provence."

New or Little Known Plants.

Chrysanthemum Mrs. Fottler.

THE Chrysanthemum illustrated on page 581 is the variety Mrs. Fottler, sent from Japan two years ago in the famous Neesima collection, which included such notable kinds as Mrs. Hardy, Lilian Bird, W. H. Lincoln and Kioto. The flowers of Mrs. Fottler are borne on long, stiff stems, and they are of large size, very full, and of a distinct tint of pink. The petals are long, feathery, and very persistent, so that the flower will remain perfect for a long time. The plant not only gives fine blooms for exhibition, but it has proved very satisfactory

for market purposes, and in the neighborhood of Boston it has been the most profitable pink variety grown.

Newton Highlands, Mass. *A. H. F.*

Foreign Correspondence.

London Letter.

WE are in the midst of the Chrysanthemum season, and the so-called centenary of the introduction of this plant into English gardens is being duly honored by exhibitions, conferences and publications of all kinds. The value of the Chrysanthemum as a decorative plant is second only to that of the Rose. Easily grown, inexpensive, yielding splendid results in a short time, accommodating as regards size and habit, almost endless in the variety of shade, size and form of its flowers, the Chrysanthemum is indeed a magnificent garden-plant. Exhibitions such as these teach a great deal, and so also do conferences; but the real beauty of the plants is rarely revealed at either. I confess to a weakness for a plant natural in shape, well-leaved and full of flowers, not large and mop-like, with their crutch-like props, but medium in size, and plenty of them. I have seen a few such plants, their names Val d'Andorre, Alice Bird, Edwin Molyneux, Queen of England and such like. They were plants of various heights, perfect in foliage, and each bearing not three or four, but twenty or thirty, blooms. These are decorative plants which may stand alone and form a picture by themselves. The exhibition plant here is a totally different thing. The cut flowers are many of them really wonderful productions, and this year they are, perhaps, better than usual, though the exceptional mildness of the weather this month and last has not been favorable to Chrysanthemums, the flowers being somewhat weak and flabby.

The Conference held at Chiswick was a great success in papers by specialists and a general comparing of ideas and opinions relative to the plants. Mr. Hemsley, a member of the Kew staff, dealt with the botany and literature of the Chrysanthemum. We are not much concerned with the name of the species from which the garden plants originated; otherwise Mr. Hemsley's discovery that by right of priority *C. morifolium* is the proper name for the plant hitherto known as *C. Sinense* would alarm those who object to the disturbance of old names which have become as household words. Mr. Shirley Hibberd, Mr. Harman Payne and Mr. E. Molyneux, three men whose names stand first amongst admirers and growers of the Chrysanthemum, also contributed interesting papers on its history and development.

The exhibition of the National Chrysanthemum Society, which was held this week at the Aquarium, was remarkable for the display of good standard sorts rather than for anything new. The principal exhibitor of new kinds was Mr. Cannell.

Fig. 147.—Chrysanthemum Mrs. Fottler—See page 580.

Such sorts as Avalanche, Edwin Molyneux, Mr. R. Brocklebank, Boule d'Or, Princess of Wales, Lord Alcester and Mrs. H. Cannell were in splendid form, nothing among the new kinds approaching them. I have a weakness for the Japanese sorts, and Avalanche as a cut flower I consider is the purest and most beautiful of all Chrysanthemums. Amongst colors the king of all is Edwin Molyneux. The most striking of the newer sorts is Etoile de Lyon, of which Mr. Cannell showed a large number of magnificent blooms. It was certificated last year. The flowers sometimes attain a diameter of fourteen inches, and not one of the many exhibited by Mr. Cannell was less than ten inches across. The color varies from white and rose to deep rosy purple and silver. It is a broad petaled and rather flat variety of the Japanese section. The new kinds certificated were Lady Dorothy (incurved), a large flower; color deep bronzy cinnamon and gold. Mr. Cannell, who exhibited it, declares it to be one of the best and most lasting of the section. Miss Margaret (large Anemone), with rosy ray florets and sulphur centre; John Doughty (incurved), a sport from Queen of England, with the base of flowers pink and a buff centre flushed with pink; Madame A. Carrière (Japanese reflexed); Mrs. S. Coleman (incurved), pink, with pale yellow centre; Alice Stevens (Pompon), golden yellow, a fine flower; Madame Baco (Japanese), remarkable for its size, the narrowness of its petals and its delicate color—a rosy lilac. Amongst those which did not obtain certificates were several of considerable promise, but not in the best condition. One, named Admiral Sir Thomas Symonds, a very fine yellow Anemone, and fragrant, was shown by Mr. Cannell, to whom the Admiral had presented a plant which he had brought from China. Evidently much greater development in size, variety and color has resulted from the manipulations of English and French breeders of the Chrysanthemum than in the hands of the Chinese, who are said to be a long way behind. What we want now is hardier kinds, such as will flower well outside in an ordinary season. There is also a tendency to breed taller plants than is desirable.

The injurious effects of London fog on plants and flowers have been so very marked of late years that the Royal Horticultural Society has decided to collect information on the subject, with a view to discovering, if possible, some means of counteracting it. At present we are unable to decide whether the injury done is due to absence of light or to direct effect of some of the components of the fog, though, so far as my observation goes, it is almost certainly the latter. A heavy yellow London fog is a terrible demon. We do not get the worst of it at Kew, but at Chelsea it is often very bad. The Orchids there suffer much from it. Messrs. Veitch and Mr. Bull find it almost impossible to get flowers, especially white ones, in winter. I have seen a whole houseful of Phalænopsis spikes destroyed in a single day by a fog at Clapton. Not merely expanded flowers, but buds even as small as pin-heads, are withered and reduced to pulp, as if they had been dipped in boiling water. The large flowers of *Angræcum sesquipedale* suffer just as much as those of the delicate Phalænopsis. It is not the fact of the flowers being white that causes them to suffer, as *Masdevallia candida* and *Odontoglossum crispum* were apparently unharmed at Clapton. Bouvardias, both leaves and flowers, turn black, as if they had been scorched; the leaves of many plants wither and fall off; even such Orchids as Vandas suffer at Chelsea, their lower leaves turning yellow when the fog is severe. Plants under glass suffer a great deal more than those out-of-doors. The fogs in the country do not do any appreciable harm, so far at least as I have been able to ascertain. Gardening in the immediate neighborhood of the metropolis is growing more and more difficult in consequence of these dirty fogs in winter. The Messrs. Veitch have been compelled to remove the whole of their seedling Orchids to Slough, out of the reach of the London smoke, and Mr. Seden is now able to continue his work of hybridizing and plant-breeding in an atmosphere much more congenial than that of Chelsea.

Pleiones have been very good here, in spite of early fogs. A delightful bank of *P. lagenaria* was for a time the most charming feature of the Orchid-house. The plants are grown in pans a foot across, and on some of the pans I counted over eighty expanded flowers. Some plants of *Adiantum cuneatum* were arranged with the Pleiones, producing a pretty effect. These have been succeeded by equally good pans of *P. Wallichiana* and *P. maculata*. After these come *P. humilis* and *P. Hookeriana*. The Pleiones are amongst the easiest of plants to manage. As a rule, they fail through excessive heat. They are alpine plants, requiring cool or green-house treatment, except during the period when growth is most vigorous. This is usually about the end of March or in April and on until June, an intermediate temperature with an abundance of moisture being then most suitable for all of them.

We are promised a considerable increase in the number of great plant exhibitions to be held next year in London. The Royal Aquarium, Westminster, caters for the public by providing attractions of a very varied nature, from white kangaroos to cannibals and Samsons. The success of the Chrysanthemum exhibitions held there has no doubt determined the authorities to compete with the Crystal Palace, the Botanical Society and the Royal Horticultural Society next year in the matter of exhibitions of plants generally. They propose to hold an exhibition on each month from March to November, and offer substantial prizes. Flower shows are supposed to foster a spirit of emulation among the crowds who go to see them, and perhaps they do a little good to horticulture by showing what has been or can be done—a kind of reporting progress. But it is easy to overdo this kind of thing; and we are not quite sure that shows which have gate money as their sole object are not to be condemned on that account. You do not appear to hold many plant exhibitions in America. Is it because the people do not believe in them, or because you have not time?

CHATSWORTH.—The very interesting notice of this famous ducal residence which appeared in a recent number of GARDEN AND FOREST has been read with pleasure here. English horticulturists are proud of Paxton and his works, and Mr. Downing did not say one word more in praise of Chatsworth and its gardener than they deserved. You may be interested to learn that Paxton was what is known as a "Chiswick lad," for it was at Chiswick that the Duke of Devonshire saw and liked him and finally engaged him as gardener. I believe his wages started at twenty-five shillings per week. After he was knighted, Paxton was member of Parliament for Coventry. Chatsworth is still a grand garden; but it is not the only one, as it was, perhaps, when Paxton was its head. So far as I could judge when I saw it a year or two ago, the keep of the gardens was first-rate, and the cultivation of some things exceptionally good. The present gardener, Mr. Owen Thomas, is known as a man of exceptional ability. Chatsworth may be looked upon as a kind of Kew for the Midlands, as it is open to crowds of visitors at almost all times. Cheap trips to Chatsworth from Sheffield, Chesterfield, Lincoln, Derby, and other towns, are often arranged, and many hundreds of people are allowed to walk through the grounds, the houses and the palace on certain days. *W. Watson.*

London.

Cultural Department.

Copper Sulphate against Fungi.

EXPERIENCE during the summer of 1889 encourages the belief that we have in the solutions of copper sulphate a defense against many of the fungus pests which so seriously threaten the prosperity of our agriculture. In 1888 the efficacy of what is known as the Bordeaux Mixture as a preventive of mildew and Black Rot of the Grape was fully proved. This year experiments have taken a wider range, and many of the so-called diseases of plants have been successfully treated. The Apple-leaf rust (*Ræstelia pyrata*) succumbs to an occasional spraying with the Bordeaux Mixture. The Quince blights (*Morthiera Mespili* and *Hendersonia Cydoniæ*) are likewise prevented, and the fungus which causes the blight of leaves and cracking of fruit of the Pear may now be regarded as under the control of the copper solutions.

The prevention of this Pear fungus, *Entomosporium maculatum*, is, perhaps, of greater advantage in the nursery than in the orchard. Where the disease is epidemic in the nursery it places a veto upon the budding and grafting of young Pear stocks. The leaves are destroyed just when their aid is essential to the vitality of the bud or cion. By spraying the nursery rows every three weeks during the season of growth with the Bordeaux Mixture the leaves are preserved in health and the success of the grafter's labor is assured.

But in addition to this use of the copper solution it is found to be preventive of the Tomato blight (*Macrosporium Solani*), and (which is of far wider importance to our agriculture) it prevents the Rot of the Potato, *Phytophthora infestans*. In treatment of this disease of the Potato-plant some of our experiment stations have this year been quite successful. My experiments in this line have had gratifying results. For many years in this region of southern New Jersey every attempt to grow the Peachblow Potato has been a failure. At about the time the plant is in blossom and the tubers are say one-fourth grown, this deadly blight invades the Potato field and sweeps over it like fire. I have had an acre of Peachblows showing every sign of thriftiness and giving

promise of a heavy crop, and in one week from the time of the appearance of this blight every plant was dead or dying. It is the prevailing opinion here that the Peachblow Potato is a variety which is "run out," and its culture has been generally abandoned.

Happening to see, last autumn, a few bushels of small Peachblow Potatoes for sale, I bought them for the purpose of giving them another fair trial under the protection of the Bordeaux Mixture. Last June I plowed a clover sod between the tree-rows of an orchard, and there planted these Potatoes in five equal plats of three rows each, manured in the row with the Mapes Potato Manure at the rate of half a ton per acre. The plats lay side by side, running north and south. When the plants were a foot high, and before they blossomed, I began to spray some of them with the Bordeaux Mixture, and repeated this operation every two or three weeks thereafter until nearly the last of September. The times of treatments were regulated somewhat by the weather and the frequency of heavy rains. At any rate, I aimed to keep leaves and stalks on the sprayed plats pretty thoroughly whitewashed with the copper sulphate solution, so that its presence was always visible all over the plants. Whenever a drenching rain washed off the application it was renewed as soon as possible. I made the treatments with the portable Eureka spraying machine. I thus sprayed Plats 1 and 2, left Plat 3 (the middle plat) untreated, and sprayed also Plats 4 and 5.

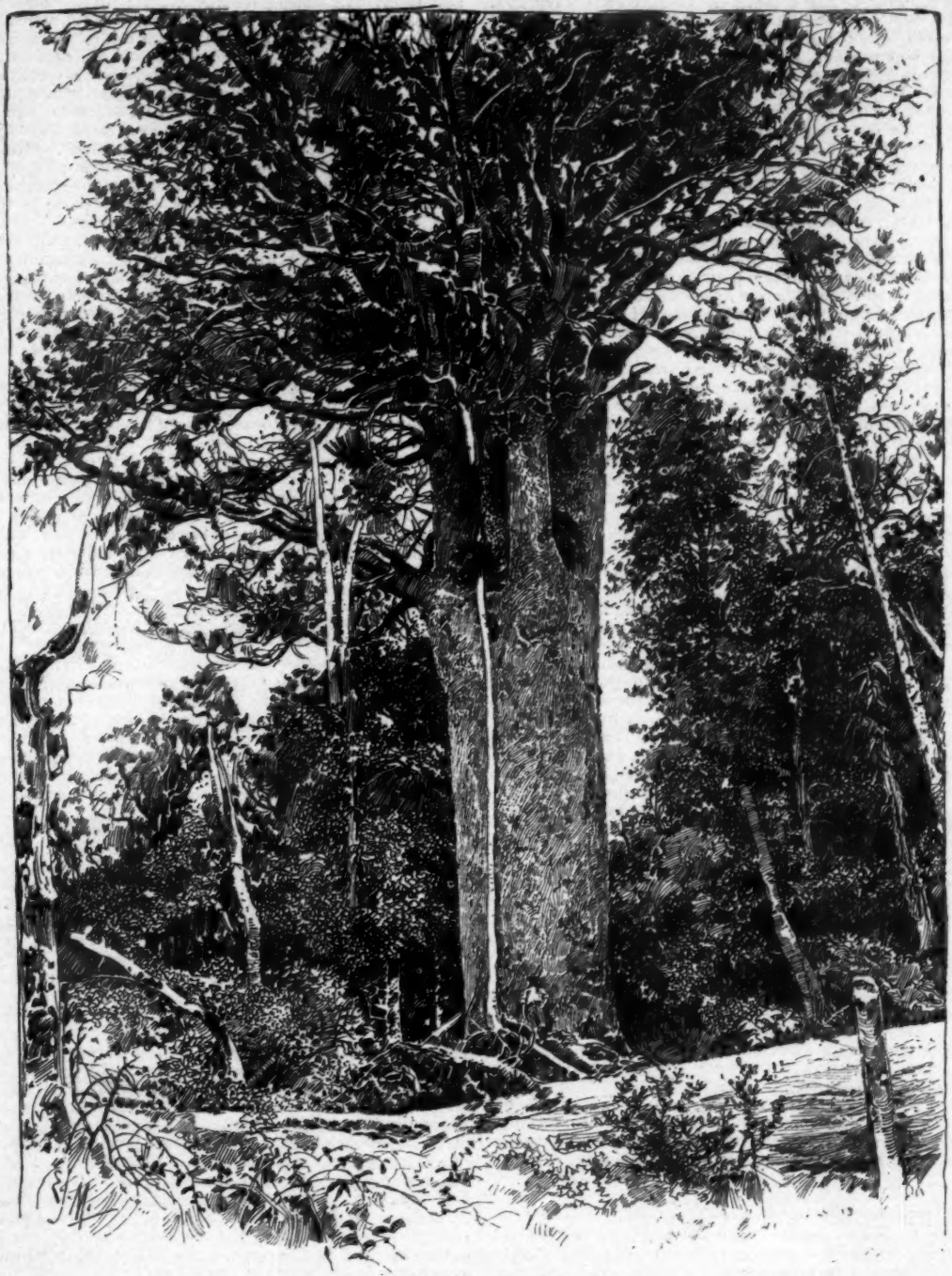

Fig. 148.—The Kauri Pine.—See page 579.

About the time the plants blossomed the middle plat (No. 3) was, as usual, struck by the blight, and in two weeks all of the potato tops on this plat were dead and dry. The plants on the other plats were green and growing as vigorously as could be wished. They remained green and growing until killed by frost in November.

I then dug and weighed separately the total product of each plat. Plat No. 1, sprayed with Bordeaux Mixture, yielded 346 pounds of fine, large, marketable potatoes, which were sold as soon as dug for a dollar a bushel. Plat No. 3, not sprayed, yielded only 164 pounds of small-sized tubers, scarcely one of which was marketable.

The diameter of the largest tuber on the untreated plat was three inches. The diameter of the largest on the treated plat was five inches. There is a marked difference in the cooking of potatoes from the unsprayed and from the sprayed plats. Those from the plat not treated are immature and "soggy." Those from the treated plats are mealy and have all the excellence for which the Peachblow potato was formerly esteemed.

I have saved ten or fifteen bushels of these Peachblows to plant next year, in the confident expectation of a crop of 350 bushels of potatoes per acre. Under the unfavorable conditions in which these experimental plats of potatoes were grown (between rows of trees twenty feet apart and twenty years old) I did not expect a large crop. Yet the yield of the treated plat (No. 1), 346 pounds from 225 hills, is not bad, under the circumstances, being about 125 bushels per acre.

Of the Bordeaux Mixture employed the formula is: six pounds of pulverized sulphate of copper (blue vitriol), dissolved in four gallons of hot water; four pounds of fresh lime, dissolved in four gallons of cold water; mix the two solutions and dilute with cold water to make twenty-two gallons of liquid.

I believe, however, that the ammoniacal solution of carbonate of copper will be found as efficient a fungicide as the Bordeaux Mixture, and it has the advantage of being more readily prepared and more easily distributed in spray. Its formula is: carbonate of copper, three ounces; ammonia, one quart; mix. The copper carbonate will dissolve almost at once in the ammonia liquor. Then dilute this mixture with cold water to make twenty-two gallons of liquid.

From sundry experiments which I have made this year, and which I have reported in detail to the United States Department of Agriculture, I conclude that it is the copper in solution which is specifically antidotal to fungus germs, and not the other component, sulphuric acid, of the sulphate. In experimenting on treatment of the Black Rot of the Grape I tried quite extensively a mixture made similarly to the Bordeaux Mixture, only substituting sulphate of iron (copperas) for the copper-sulphate. This mixture had no effect whatever in prevention of Grape Rot. I saw some benefit from its use, however, in prevention of leaf mildew, and it is quite likely that it may be found sufficiently effective for treatment of the blights of the Potato and Tomato. It is much cheaper, pulverized sulphate of copper costing about eight cents per pound, while copperas costs only seven-eighths of one cent per pound.

Further experiments are required to teach which of these fungicides may be the preferable one, and for what uses. Certain fungi will endure with impunity applications under which others will perish, and certain varieties of plants are damaged by chemical solutions which do not harm others. Thus, the Tomato plant will not tolerate a spraying with Bordeaux Mixture as it is used for the Potato. The mixture for the Tomato must be reduced in strength at least one-half. Nor will *Vitis æstivalis* endure spraying with copper sulphate mixtures, which do not injure the vegetation of *Vitis Labrusca*.

My counsel to those who purpose engaging in these vegetable therapeutics is to go slow. When all ready for spraying try only a few patients at first, and wait to note the effects of the medicine. Otherwise there is great danger of learning pathological wisdom as did the quack doctor who found out in his practice that "what cured the shoemaker killed the tailor."

Vineland, N. J. *A. W. Pearson.*

Bleaching and Keeping Celery.

THE Dwarf Celeries now used by most cultivators are grown on a level surface in rows four to six feet apart. Handling is the first work toward bleaching. I use cotton cord, and tie it loosely around the first plant, and then passing the string to the next, take a turn around this, tying it the same way, and continue through the row without breaking the cord, which is tied to the last plant. In this process all the leaves are gathered and tied firmly enough to hold the plant erect and compact. If tied too tightly the Celery, as it grows, will double back when the string is reached and injure the appearance of the heart. After the Celery is banked with earth, the string rots under the ground and gives no trouble at the time of digging.

Many methods of bleaching are practiced. During the past season I saw heavy paper tied about the plants by one grower, and earth was then drawn up against the paper. Another grower placed corn-stalks against the plants to hold them upright, and then banked against these. A third tied each plant separately with tobacco cord, and left them without banking and exposed to all weather till November 1st, when they were carried into deep hot-beds to bleach under leaves and boards. Another banked the plants half way up, and still another covered Celery almost to the tops. This last lot bleached in from two to six weeks, according as the weather was warm or cool.

The warmer the place in which Celery is kept, the quicker the bleaching will be complete. In early fall, bleaching causes little trouble, whether it is done by tile, paper, boards or earth.

The great difficulty is to keep Celery through the winter into late spring. That intended for late keeping ought to be left out-of-doors in the rows until severe freezing is threatened, and it should be banked half way up at least. The part out of ground should be protected from hard frost, for this makes the stalks hollow. After the plant has been taken from the ground it will still continue to grow. If the leaves are green when stored, they will remain green, and a growth from the centre will appear, which will always be white. Celery partly bleached when brought in will be better in quality than if the whole process of bleaching be left till after digging from the garden.

Darkness with a temperature of sixty degrees in the cellar will fit celery for the table quickly. If it is to be kept until spring, then a temperature as near forty degrees as possible should be maintained. Last season I saw 100 roots brought in before a hard frost and set on a cellar floor and against the wall, in a space ten by four feet and filled in with dirt half way up the stalks. The hatchway-door above was open daily, and the winter air drifted down upon the Celery, which kept until April, when more than half of each bunch, as put in, in the fall, was eatable. The tops were kept cool and often frozen, while the dirt between kept the stalks crisp; there was no furnace in the cellar. I see no advantage in trimming the roots before bringing them into the cellar.

West Springfield, Mass. *W. H. Bull.*

Winter Flowering Plants.

AT this dull season of the year some change in arrangement and a few bright flowers make a great difference in the appearance of the plant-house. As it is rather early for many of the most showy flowers, as, for instance, Primulas in variety, Narcissi, Calceolarias, Cinerarias and Azaleas, we must look elsewhere for the glow of color which is needed. It is true that some of these plants may be had in bloom during the winter by a little forcing, but they are more often looked upon as spring flowers only.

For winter flowering some of the Eranthemums, though considered by many as rather too old-fashioned, will be found very useful and effective, and they have the additional merit of being among the easiest to cultivate. This is an extensive genus of plants, many of which are natives of the East Indies, and, although some of the species are rather weedy, yet there are a number of very pretty ones among them, and it is to a few of these that attention is now directed.

Perhaps the oldest, and certainly one of the prettiest, of the Eranthemums is *E. pulchellum*, its flowers being of a rare shade of vivid blue. It is a rapid grower, and if generously treated will give an abundance of bloom, and though the individual flowers do not last long, yet, as they open in succession on the spike, the plant continues to make a show for a considerable time. *Eranthemum tuberculatum* is another fine species. It is of slender growth and shrubby habit, the branches being more or less marked with small, knotty tubercles. Its nearly white flowers are produced from the axils of the leaves in great profusion. *Eranthemum Andersonii* is also a notably pretty member of this family, though perhaps less frequently seen than the two previously mentioned sorts. *E. Andersonii* forms spikes of bloom from six to eight and sometimes even ten inches in length, while the flowers are quite showy, the upper lobes being pure white and the lower one dotted with dark crimson.

While speaking of Eranthemums, it may be well to state that one kind, at least, *E. atropurpureum*, is a useful plant for bedding out in summer, its dark, glossy foliage being somewhat similar in color to that of *Achyranthes Lindeni*, though rather broader and more showy than the latter.

Either of these Eranthemums may easily be rooted as cuttings, and will flourish in almost any moderately light soil,

though, to make shapely plants, they should be pinched occasionally as the growth proceeds.

Another group of pretty dwarf growing plants are the Aphelandras, which are not only ornamental in flower, but also have handsome foliage. One variety in particular, *A. nitens*, is specially noticeable in this respect, the upper surface of the ovate leaves being a very glossy olive green, while the under side is dull purple, and this, contrasted with the brilliant scarlet of the flowers, gives a very striking effect. *Aphelandra Rœzlii* is also a good variety, and its foliage offers a great contrast in coloring with the preceding species, the leaves of *A. Rœzlii* having a silvery appearance. The flowers of this species are bright orange in color, and are produced in terminal spikes in common with the other members of the genus.

Another Aphelandra of rather more recent introduction is *A. fascinator*, also prettily marked in foliage, and a rapid grower, though the leaves have less substance than those of the last, and are consequently more subject to the attacks of red spider unless grown in quite a moist atmosphere and fairly well shaded. In addition to the above there are several other Aphelandras in cultivation, though some of them may be less easily procured than those to which special reference has been made. *A. aurantiaca*, *A. Liboniana* and *A. variegata* are all interesting.

The Aphelandras will make satisfactory progress if potted in good loam, rather sandy, to which may be added a small proportion of peat if convenient, although it is not absolutely essential to their welfare. Their propagation is easy, either by cuttings or from seeds, the latter being preferable, as seedlings not only make the best shaped plants, but there is also less trouble from insects when they are grown by this method, because old plants kept for stock are very liable to become infested with mealy bug and scale. As to temperature, sixty to sixty-five degrees will be found to suit the Aphelandras, though a somewhat lower temperature will not specially injure them. In the winter, full sunlight should be given, while some shading is necessary in summer.

Holmesburg, Pa. *W. H. Taplin.*

Orchid Notes.

Oncidium varicosum.—This showy Orchid is one of the most valuable for cutting. Its golden yellow flowers are borne on large branching panicles, often three feet in length and bearing 150 to 200 flowers at one time, and these will remain in perfection nearly two months if the atmosphere is kept dry and cool. It is advisable, however, not to allow the flowers to remain on the plant so long, for it is liable to be considerably weakened, and it will eventually be killed if this course is persisted in. There is a fine variety named Rogersii, in which the lip measures two and three-quarters inches across; but this plant is exceedingly scarce, though many inferior varieties are sold under this name. A part of the typical plant is in the collection here. *Oncidium varicosum* was introduced about twenty years ago from Brazil, where it has a wide distribution, and, under varying conditions of climate, varies a good deal in size and habit. It grows freely in the intermediate house, requiring liberal treatment during the growing season. It should be shaded from the sun no more than necessary to keep the leaves from being burnt, and it dislikes much potting material around its roots—a thin layer of moss is sufficient; baskets are preferable to rafts or blocks. I find the plants deteriorate rapidly after being a year or so on the blocks.

Odontoglossum Kramerii.—This very rare and attractive little plant is now in flower with us, and is doing fairly well in a basket of moss in one corner of the Phalænopsis-house. It is said to be found in only one locality on a mountain-slope in Costa Rica, and was introduced from there in 1868 by Kramer. It is a small growing plant, with compressed ovate bulbs with one oblong-lanceolate leaf about seven inches long. The ascending scape bears three to five flowers one and a half inches across. These are white, shaded to violet in the centre. The clawed and half-round lip is two-lobed at the apex, dark violet, with bands of white and reddish brown at the base. The general appearance of the flower reminds one of the better known *O. citrosmum.*

Kenwood, N. Y. *F. Goldring.*

Cattleya Walkeriana is a splendid dwarf species, with bulb-like stems from two and one-half to four inches high, bearing an oblong-elliptic, obtuse, leathery leaf, with one, and sometimes two, beautiful rose colored flowers, the lip of which is of a richer rose than the other parts and has a very slight tinge of yellow. The flowers often measure from four and a half to five inches across. We generally have our plants bloom in November and they make a very fine display at this dull season. The large flowers from such a small, leafless bulb always excite surprise. The blooms last from four to five weeks when kept rather cool and dry. They are very sweet scented and fill the house with their fragrance. Our plants are suspended from the roof in rather a light place, in small pans, with a small quantity of sphagnum moss and charcoal, and they flourish fairly well in this way. They do not like much sunshine.

Cattleya maxima Backhousii is a very distinct and desirable variety. The bulbs are rather short and plump, with stout, erect leaves. The sepals and petals are bright rich rose, and the lip is elegantly variegated with very dark crimson veins down the centre, and it has a beautiful yellow throat. This is, no doubt, the most beautiful of the Maxima type and should be found in every collection. It nearly always blooms here in October or November. We grow it both in pots and pans suspended from the roof; it likes abundant light, and a little sun appears to ripen up the bulbs and induce it to flower much more freely. Our plants are kept rather dry after flowering until they show signs of growing, and then a copious supply of water is given.

Staatsburg-on-Hudson. *F. Atkins.*

Autumn Flowers.—Much has lately been written on the various shades of color to be seen in the Autumn Anemone, *A. Japonica*, ranging as they do from deep rose to pure white. In their way these plants are unquestionably without rivals for autumn decorative use. We wish to call attention, however, to a plant that flowers at the same time as the Anemones, lasts fully as long, and the color of which is a beautiful dark blue. The plant is known as *Aconitum autumnale*, although we are now informed that this is only one of the plant's many specific synonyms. It is often sold under the name of *A. napellus*, and, indeed, this is the title under which it came into our own possession; but it is very distinct from *A. napellus*, which flowers in early summer, and is not so showy as *A. autumnale*, or *A. Fischeri*, as we are to call it in future. The plant grows about three feet high, the spike is often branched so as to form a panicle, and these branches prolong the flowering period for a considerable time, and when planted with the Anemones, the combination of colors, red, white and blue, is very striking during the latter part of October. *A. Fischeri* is a native of China and is perfectly hardy. The roots are tuberous and readily admit of division for the purpose of increasing the stock, and, in addition to this means of propagation, seeds are produced abundantly, which germinate readily when sown and placed in a gentle heat.

Passaic, N. J. *O.*

Gaillardia hybrida grandiflora.—Stray blooms of hybrid Gaillardias in the last week of November remind me to note that these are the most persistent bloomers among hardy plants. My plants came into bloom early in June, since which time they have flowered constantly and in profusion, and now have many buds which will not mature. This very ornamental genus has been worked up in recent years, and probably from hybridizing *G. aristata* and *G. picta*—the former giving hardiness and the latter coloring. The English florists offer constantly many new varieties, but there is a great similarity among most of them. They are usually yellow, with a more or less distinct zone of deep red, though some yellow selfs are offered. The petals are usually flattish, though sometimes quilled and fringed. A package of seed will produce many pleasing kinds, quite satisfactory to the ordinary cultivator. They bloom freely the second season from seed. The plants are entirely hardy, in this section, and rapidly increased by cuttings of the roots. Owing to this readiness to increase from pieces of roots, Gaillardias are rather difficult to eradicate from borders, unless care is taken to lift with the roots entire. They certainly may be classed among the most useful of hardy herbaceous perennials, either for show or for cutting.

Polygonum amplexicaule, var. oxyphyllum.—This is a Himalayan Knot weed, introduced to cultivation by Messrs. Hallock, of Queens, New York, under the more poetic name of Mountain Fringe. This variety, which is said to have been brought to this country several years since by Professor Gray, is a very vigorous one, too vigorous for small places, as it grows, with numerous branches, to the height of five feet. With me it came into bloom in October, bearing clusters of small creamy white flowers, which are attractive on the plant, but which soon fade after they are cut. As a sharp frost ruins the plant, shelter will be needed for it in this climate. Where bold masses are needed—in large places and parks south of this latitude—the plant will be very useful, and for persons who enjoy the foliage of Smart weed it may be used in more modest collections. But since it does not give a specially large

crop of flowers, the space it fills in small gardens can be more profitably occupied. My plants are curiously unlike the figures in the catalogues, in which they appear of a different habit and with a much larger ratio of bloom to the amount of the foliage.

Elizabeth, N. J. *J. N. Gerard.*

The Forest.

Forestry in Great Britain.

DR. WILLIAM SOMERVILLE will deliver during the session of 1889-90 a hundred lectures on the Principles and Practice of Scientific Silviculture before the University of Edinburgh. The following extracts from the first of the series, which are taken from a report published in the *Gardeners' Chronicle*, are of general interest, and deserve careful reading and wide circulation in this country.

Dr. Somerville, in opening his lecture, referred to the great attention that was paid to forestry in Germany, India and other countries, and showed how the state forests in these countries were made an important source of revenue, and had a most important bearing on the welfare of the nation. He then proceeded: It is undoubtedly true that we have lost much through the scarcity of our state forests, for had they been present in greater numbers the regretable condition of many of our private woodlands would not now have existed. This would have been a great gain to the country in general; but if the same improvements could have been brought about by some other means than the extension of government forests, the gain would have been still greater.

The experiences of other nations, however, tend to show that no other means have ever had very much effect. It is true that we have always managed to get along fairly well in other departments with the very minimum of state interference and example, and, undoubtedly, the independent spirit which has thus been developed has stood us in good stead in carrying us over many difficulties. But the peculiar conditions and circumstances consequent to the ownership of forests, all point to the state as being in a more favorable position to make the best use of land stocked with trees than the private individual can be. It is a great question, and one whose discussion in all its various ramifications would lead us far beyond our limits of time. Suffice it to say that the experience of nations and the investigations of political economists point to the conclusion that, although the state proves a bad farmer, it makes an excellent forester. But apart altogether from the purely economic bearings of the case, many circumstances may be present to compel a state to interfere with forest management in order to secure the public welfare. Extensive denudation near the head waters of rivers has often been followed by destructive floods, affecting not the owners of the cleared areas, but the inhabitants of districts situated, it may be, hundreds of miles away. This has been strikingly exemplified in many parts of Austria, where the wholesale removal of trees from large areas in the Tyrol, without any steps being taken to restock them, has resulted in widespread inundations and immense loss of life and property. The cause of these Austrian floods has, within recent years, been made the subject of government inquiry, with the result that the state has purchased large areas of private land in the Tyrolese valleys in order to preserve the existing forests and to restore those which have been spoiled. America can also furnish many cases of flooding following denudation. Besides the dangers of inundation, those arising from avalanches are also increased by denudation, and many valleys in Switzerland, the Tyrol and the north of Italy are comparatively safe only through the preservation of large masses of wood on the mountain-slopes. In these cases, and in many others which will readily occur to your minds, state interference in the management of forests is entirely justifiable on the grounds of public safety. None of them, however, apply with much force to our own country. At one time the maintenance of a supply of oak for the navy was a question of great national importance, but it is now only historically interesting. It would thus appear that in this country the state might very well refrain from meddling with forestry as an important department of national finance, were it not for the beneficial educational influences which would be started. On this account the state forests which we already possess should be made models of good management, and others should be obtained in important centres—care being taken to select places where the extra work would be a decided benefit to the rural population.

Dr. Schlich, in his recently published *Manual of Forestry*, directs attention to the fact that Canada is the only British colony which supplies us with an appreciable quantity of wood. At any moment, however, these imports may cease, for even now the United States is able to take all the timber which Canada can spare. As a matter of fact, our wood imports from that colony have decreased thirty-two per cent. within the last five years, and, as they may be extinguished before other five years, we will have to depend entirely for our imported timber upon countries over whose policy we have no control. Dr. Schlich says that we import £13,000,000 worth of forest produce which we could grow at home, for which purpose the afforesting of 6,000,000 acres would be necessary. This land he believes to be all available in Scotland, and strongly urges the desirability of extended sylvicultural operations.

We have now touched upon two of the factors which have exerted their influence upon British forestry, namely, scarcity of state forests and our insular position; a third is to be found in our fortune in possessing such rich and extensive coal-fields. No country in Europe can approach us in this respect. Whereas wood is still the most important article of fuel in wide regions of the continent, it is but little appreciated for heating purposes in this country. Had the case been different, we should have been compelled to look to our forests to furnish an appreciable supplement to our supplies of coal fuel, and necessity would have forced us to bestow more care upon our forest management. Those who have given their attention to the subject tell us that we are now within measurable distance of the time when we shall have to face a diminishing coal supply, and, finally, exhausted coal-fields. Although it is probable that the question of providing a substitute for coal will not urgently demand a solution in our time, still it is undeniable that, sooner or later, it must be faced. Some enthusiastic foresters press the desirability of more extensive tree planting, so that a store of firewood may be laid up against the evil day. That there is some wisdom in the suggestion no one will deny; but Professor Helferich's calculations with regard to the matter do not afford us a large measure of comfort. He says that if we take two and seven-tenths pounds of wood as giving the same quantity of heat as one pound of coal, and one acre planted with Scotch Pine trees as capable of yielding annually eighty-six and one-third cubic feet of wood, equal to twenty-eight hundredweight, without the capital stock of timber on the land being encroached upon; then, in order to yield the equivalent of the coal output of England and Wales, it would take a fully productive forest area more than six times the total extent of these countries, even supposing our present imports of timber to suffer no diminution. From this it is evident that, even with a largely extended area, our forests cannot be expected to furnish a complete substitute for coal, although undoubtedly they could assist to a considerable extent.

Correspondence.

Chrysanthemum Ada Spaulding.

To the Editor of GARDEN AND FOREST:

Sir:—Referring to the remarks of your Boston correspondent on the appearance of the Chrysanthemum Ada Spaulding at the recent exhibition in that city and to your note upon the same subject, allow me to say that I have no doubts as to the merits of this variety, but consider it one of the very best of the new kinds.

It is a robust grower, with short-jointed, heavy wood and foliage of the thickest texture. I have yet to see a single leaf attacked, either by white mildew or black rust. The flowers are of the largest size, distinctly globe shaped—that is, the lower half of the petals recurve to the stem, the upper ones incurving to the centre, thus forming a nearly complete sphere. The lower part of the flower is of a pleasing blush rose, the centre being pure white.

The flowers shown at Indianapolis were seven and three-fourths inches deep by six and three-fourths inches in diameter. It is plainly a mistake to exhibit seedlings or new varieties when not in good condition, which was evidently the case with this flower when shown in Boston. First impressions have much to do in determining whether one will ever fancy a new-comer. The flowers of Ada Spaulding which I saw at Orange and Philadelphia were small and not at all characteristic, and therefore they did injustice to a really valuable acquisition.

If it is the proper work of the National Chrysanthemum Society to determine which plants shall and which shall not be distributed, the task will be a difficult one. To condemn a

plant is a serious matter in many cases. It not only discourages the tyro from persevering, but the judgment may be unsound. It is easy to pass by varieties that are not at their best when shown before a committee, and as the legitimate season of the Chrysanthemum extends now from the 20th of September until the 20th of December, varieties may be neglected which may be very good either early or late. There are few Chrysanthemums in which I can see no beauty, but for the best interests of all there must be a limit to the propagation of varieties which are at best duplicates of existing kinds.

Pearl River, N. Y. *John Thorpe.*

A Lesson in Transplanting Evergreens.

To the Editor of GARDEN AND FOREST:

Sir.—During the month of August last I witnessed the transplanting of several hundred Austrian and Scotch Pines. The result was the loss of nearly the whole lot; and it was such a surprise to me that I think the facts in regard to it worth recording. The weather was all that could be wished for, being warm and moist, and the soil was in the same condition. The Pines had been growing close together in rows and were from four to five feet high. As they were not as bushy as could be wished, we thought best to prune them in well, and, after the transplanting, a man was sent with shears to clip them closely. This he did, cutting off all the latest growth, taking from six to ten inches from the branches. Out of 300 plants all were so trimmed except some half dozen, which were purposely left unpruned to see which would do the better. At that time I confidently expected that the pruned trees would show the benefit of the work. However, they soon began to turn brown, and in the end every one died, while every one of the few left unpruned are alive to-day.

As soon as it was observed how the matter was going to end, another row was set out, unpruned, and all the plants in it are thriving to-day. No doubt the severe pruning was the cause of this failure. All the younger or active foliage had been cut away, leaving only that which was past its usefulness and which was about ready to drop off. The trees were, in fact, in just the same condition that a deciduous tree would have been if stripped of all its leaves in the middle of summer. It was a costly but a most valuable lesson and one worth putting on record as a warning to others.

Germantown, Pa. *Joseph Meehan.*

Variegated Wild Plants.

To the Editor of GARDEN AND FOREST:

Sir.—I found in 1888, near here, a prettily variegated form of *Polygonatum biflorum*, and it has kept its variegation during two years of cultivation. In the garden of a friend there is a plant of *Symplocarpus fœtidus*, the foliage of which is suffused with large white blotches, and he tells me this is the second he has found in his wanderings. Variegated plants of *Capsella Bursa-pastoris* and *Portulacea oleracea* are frequently to be met with here in the summer months. These instances are offered in response to the suggestion of Dr. Sturtevant.

Passaic, N. J. *E. O. Orpet.*

To the Editor of GARDEN AND FOREST:

Sir.—In your issue of November 6th a correspondent asks for additions to the list of variegated wild plants, which he gives.

Rudbeckia hirta.—On marshy land near Klinger Lake, Michigan, I noticed for the first time, in 1887, a number of plants upon which the yellow rays were variegated with brown. This year more regularity and deeper coloring was observable, and in one instance, at least, a distinct circle at the base of the cone. *Dorcas E. Collins.*

Klinger Lake, Mich.

Recent Publications.

Annual Report of the Royal Botanic Garden, Trinidad, 1888. By J. H. Hart, Superintendent. Handsomely illustrated with a series of views of several of the most interesting trees in the garden, including a fine specimen of the Traveler's tree (*Ravenala Madagascariensis*), of the great Bamboo, the Palmyra Palm (*Borassus flabelliformis*) and of other Palms.

As a scientific station the value of the Trinidad garden is very great, and much of its present success is due to the energy of the new superintendent, who is doing wonders in his efforts to develop the material prosperity of the British West Indies, by the publication of bulletins on various useful plants, and by the introduction of others from different parts of the tropics. The Trinidad garden, too, is the richest and most beautiful probably in the tropics of the New World, and there is no spot where so many interesting plants of the tropics can be seen growing together which can be so easily reached from this country. It is gratifying, therefore, to read in Mr. Hart's report that the number of Americans who take advantage of this opportunity and visit the garden is steadily increasing, and that "the amount of energy and enthusiasm shown by visitors from the north is something surprising—certainly eclipsing anything seen from the European side of the world."

Department of Agriculture, 1888. *The Report of the Botanist*, by Dr. George Vasey, contains a description, with figures, of a number of Grasses of economic value, to which are added accounts of the western Plantain (*Plantago Patagonica*), a native of South America, but now spread into various parts of North America, and extending as far north as British Columbia on the Pacific side of the continent, and to New England on the Atlantic; of *Lygodesmia juncea*, a perennial weed common in the Rocky Mountain region, especially pernicious in vegetable gardens; and of *Solanum triflorum*, a wild Potato found growing from New Mexico into British America. A paper upon the *Pastoral Resources of Montana*, from the pen of Mr. F. W. Anderson, is appended.

The Bulletin of Miscellaneous Information from the Royal Gardens, Kew, for October, contains articles on the *Bahia Piassava*, a valuable fibre obtained from the leaf-stalks of the Brazilian Palm (*Attalea funifera*), largely imported into Great Britain, and on *Seedling Sugar-cane plants* at the Barbadoes; on the cultivation and production of the very successful *Cinchona* plantations in Jamaica; on *Gambier*, largely used in tanning and obtained from *Uncaria Gambier*, a climbing plant, native of and largely cultivated in the Strait Settlements of the East Indies, and on *Fibre Industry* at the Bahamas.

Hooker's Icones Plantarum. The October issue completes vol. xix. of the entire series and contains figures of several of the small Orchids of the Indian flora now in process of elaboration, by Sir Joseph Hooker, for his *Flora of British India;* and a continuation of the remarkable new Chinese plants which Dr. A. Henry has discovered in the western provinces. The most interesting of these are *Tetracentron Sinense*, a new genus of *Magnoliaceæ*, a tree twenty to fifty feet high, with the habit of Cercidiphyllum, but with the flowers in long spikes; *Toricellia angulata*, the Chinese representative of a genus known previously in the Himalayas only, and belonging to *Cornaceæ; Cercis racemosa*, an exceedingly handsome shrub or small tree, well marked by its loosely racemose inflorescence; no less than eight new species of Maples; a new genus in *Sapindaceæ*, *Dipteronia Sinensis;* and several other plants which need not be enumerated to show the richness of the flora of western China in new forms, and the service to science which Dr. Henry has performed in making them known.

Notes.

The fifteenth annual meeting of the New Jersey State Horticultural Society will be held at Trenton, on Wednesday and Thursday, the 18th and 19th instant.

At one of the horticultural exhibitions held in the Exposition grounds at Paris last summer, eighty-five new varieties of Potato were shown by M. Rigault, of Croslay.

Lilium Harrisii is already found in quantities in our flower markets. This is five or six weeks earlier than usual, and it shows that florists have learned how to force these flowers more rapidly.

The Yellow Chrysanthemum, H. E. Widener, which received the Blanc cup for the best new seedling at the Philadelphia Exhibition, has passed into the hands of Mr. E. G. Hill, of Richmond, Indiana, who will send it out.

A novelty at the World's Fair in Paris was the exhibition of a group of Orchids, chosen simply for the beauty of their foliage. With the exception of *Odontoglossum Alexandræ foliis variegatis* all were natives of eastern Asia.

Barnard College, the new institution for women connected with Columbia College in this city, recently opened with a Freshman class of twenty girls, nine of whom will devote themselves exclusively to the study of botany.

An illustration of *Pilogyne punctata* was published in the *Illustrirte Garten Zeitung*, of Vienna, for November last, with a brief note highly commending the plant. A fuller description of it, with directions for cultivation, was given in GARDEN AND FOREST on the 18th of November.

M. Bruant, of Poitiers, writes to the *Revue Horticole* that he has obtained some hybrids by crossing *Rosa polyantha* with the common Bengal Rose. The plants begin to bloom early and continue to bloom a great part of the summer, when the flowers are succeeded by persistent fruit of a bright red color. A cluster of the fruits was said to make an interesting ornament.

According to *Gartenflora*, the well known variegated Tradescantia (*T. zebrina*) is an unfailing in-door weather prophet, if grown where it can receive the sun even for a short time daily. In the flowering season it will be filled with a multitude of buds, but these will expand into the delicate lilac flowers only when a storm is near at hand. *T. viridis* is said not to exhibit this peculiarity.

A correspondent of a German periodical writes that he possesses a variety of the common blue Chicory with white flowers, and finds that it is often thought by those who admire it to be an exotic novelty. He suggests, therefore, that horticulturists would do well to keep their eyes open in the woods and fields, as they might find other pretty things that would repay cultivation even in a commercial sense.

Flowers were in great demand in New York for the Thanksgiving holiday. Fine American Beauty Roses retailed for a dollar each, and the same price was paid for the very best Grandiflorum Chrysanthemums. Violets retailed at five dollars a hundred. They are very scarce, owing to the disease, which seems more prevalent and virulent than ever this year. The unusual number of damp and rainy days may account for the increase of the disease.

The last number of the *Bulletin of Miscellaneous Information* issued by the Director of the Royal Gardens of Kew (that for November) contains articles on *Phylloxera Regulations* at the Cape; on *Collecting and Preserving Fleshy Fungi*; on the attempt to promote in Labuan the cultivation of the plant which produces palm oil (*Elæis Guineensis*), and on the different machines, lately exhibited in Paris, for the preparation of the fibre of the Ramie or Rhea-plant (*Bæhmeria nivea*).

Our readers know that the *Victoria Regia* has been cultivated out-doors in Massachusetts, for an illustration of a successful result was shown in these pages some months ago. It was not until the past summer, however, that the experiment was made in Europe. Near the Mexican Pavilion, in the Exposition grounds at Paris, was a small tank where three plants flourished, and in the middle of August produced their immense flowers. They had been brought from their native home in boxes, and sunk, boxes and all, in the basin, which was warmed with water drawn from the elevator machines in the Eiffel Tower.

From 1,000 Prune trees, five years old, Captain Guy E. Grosse, of Santa Rosa, California, has this season dried five tons of fruit, which he is delivering at the Southern Pacific station for eastern shipment at four and a half cents a pound. The rapid maturing of a Prune orchard, after arriving at the fourth year, is shown by the increase in the crop of this year over that of last year, when the yield was but 1,200 pounds. Next year it is expected the crop will be trebled. At four and a half cents a pound, the proceeds from the 1,000 trees this year equals $450. In two years more it should be nearly $3,000.

One hundred and twenty-nine thousand eight hundred persons visited the Niagara Reservation during the months of July, August and September last. A new stairway to the Horseshoe Fall has been built; the old art gallery has been turned into a library; an iron railing, 200 feet in length, has been carried around on the steepest shore of Goat Island; the stone foundation of Prospect Park has been rebuilt, and many walks have been repaved or macadamized. Money has been appropriated for the establishment, at the "Old Garden," of a nursery, whence material for planting can be drawn in future years.

Floral decorations are taking their place among advertising expedients. At the recent opening of a large retail store in Washington, the interior of the seven-story building was almost covered with groups of Ferns and Palms and large "set pieces" of brilliant hue, and with wreaths of Asparagus and Smilax, while the great show-window was arranged as a sort of conservatory—banked with Ferns and filled with flowering plants surrounding a small glass lake in the centre, the firm's stock of furnishing goods being illustrated by an intermingling of lace curtains, rugs and ornamental seats. It seems doubtful whether the effect can have been very artistic, but one can well believe that it served its main purpose by "attracting great attention."

Mr. Peter Henderson exhibited in his windows in Cortlandt Street, last week, a selection of Chrysanthemum flowers, including a number of new importations from Japan. Besides the new pink one in the style of Mrs. Hardy (Louis Böhmer), there was also shown another numbered 22, with large tubular florets, with coarser glandular hairs. Mr. Henderson's new collection comprises a number of fancy kinds, quilled and tasseled. One of these, number eight, has very narrow florets, which are so tightly twisted that they look like long, slender tubes, the lower half of which are crimson and the upper half bright yellow. They are gathered in a cluster like a plume, the florets curving gracefully outward. There are three others of this type, a pure white, a crimson and white, and a pink. They are dwarf and bushy in habit, very floriferous, and quite distinct in character from any other Chrysanthemums that have come under our notice.

The color and texture of rocks, especially when they rise in almost perpendicular walls, form a noteworthy feature in many landscapes. The soft, mellow tints of the buttresses of the Natural Bridge in Virginia will occur to many persons as an illustration of this, and all who have traveled among the northern Rocky Mountains have observed the rich color-effects upon the cliffs of that region. Writing of Lower California, Mr. C. R. Orcutt, in the *West American Scientist*, says: "No small factor in producing a pleasing effect in the scenery here is the great variety of rock-lichens everywhere prevalent. Red, yellow, gray and white are the prevailing colors observable, and the whole side of a cliff is often covered by lichens of the same tint. How many valuable mines may be hid from the prospector's keen eye by these deceptive colorings? Quartz, however, is not a favorite rock with the lichens and consequently is seldom concealed, while the lichens also frequently imitate, in coloring, the natural color of the rocks on which they are found."

One of the most interesting and valuable results of recent French horticultural effort is found in the new race of dwarf Cannas, with large and brilliantly colored flowers, produced by M. Crozy, of Lyons. A large bed of these plants in the garden of the Trocadéro, in Paris, was surrounded all summer by crowds of people. Too much has not been said of the beauty of these plants and of their value for decorative purposes, whether planted in the open ground or grown in pots or tubs. The colors of the flowers of some of the varieties are surprisingly brilliant. There seems no good reason, however, for calling the plants "dwarf," except that they begin to flower when they are not more than twenty inches high, for they grow, especially in this country, when generously treated, to a height of six or eight feet. Seventeen of the new varieties exhibited at Paris for the first time, which, on the whole, are no better than those sent out by M. Crozy during the past two years, are described in a recent issue of the *Revue Horticole*. No one who has not seen a collection of M. Crozy's Cannas in good condition, can form the faintest idea even of the beauty and the brilliancy of the flowers of the plants.

A recent writer in the *New York Sun* says that the name of Maine should be changed from the Pine-tree to the Spruce-tree State. "In the early days of lumbering," he explains, "pine made up the greater part of the cut, and little else than pine and spruce was sought for. The pine was mostly sawn into boards, and a large part of it was shipped to the West Indies, where it was exchanged for Spanish gold, molasses and sugar. While this traffic lasted Bangor's foreign trade was lively. A big fleet of the old-fashioned brigs and schooners found employment in a trade which paid good freights. Cargo after cargo of the wide, clear, White Pine boards went out to Cuba, Porto Rico and the Windward Islands, and other cargoes of the sweets of the Antilles came back. Loggers and river-drivers earned great wages; the big pine was rapidly cut away and began to grow scarce. Then came a change, the decadence of the pine and the ascendency of the spruce, the decline of the West India business and the opening of a new era in the lumber trade. In 1855 123,000,000 feet of pine were surveyed at Bangor, and only 78,000,000 of spruce. Ten years later things had changed about, for in 1865 the survey was: spruce, 107,505,867 feet; pine, 48,296,222 feet. In 1889, out of a probable survey of 150,000,000 feet, less than one-sixth of the amount will be pine, and that mostly second growth. There are lots of big Pine trees left in Maine, but they are far away to the north, and no great operations are now carried on for that kind of lumber. Some pine is cut to supply a limited demand, mostly local, but the large markets are now supplied from Canada and Michigan. This is the age of spruce in Maine.